



SAVING THE RIVER

Water Pollution

Tata Energy Research Institute

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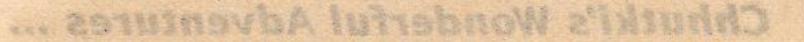


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FRANK BROS. & CO.

ENVIRONMENT PLAY SERIES



SAVING THE RIVER

Water Pollution

Tata Energy Research Institute

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This set of stories and the series dealing with the environment specially designed for children mark an innovation in TERI's activities. TERI as an institute is dedicated not only to analysing problems related to energy, environment, and natural resources in general, but also to finding solutions in these areas and disseminating information about them. There could be nothing more effective in laying the foundation for solutions to tomorrow's problems than creating an awareness and understanding on these among our children. Yet, this is a task perhaps far more daunting and difficult than that of explaining these issues to adults. To translate scientific and economic logic to a level of simplicity that does not presuppose an adequate level of knowledge is difficult. The presentation has to be absorbing, interesting, and even entertaining. Yet it must have a sound intellectual and logical basis. At the very heart of solutions for the future lies the whole question of life styles and patterns of development. Yet, children are sensitive and generally unburdened by the baggage of the past. If the presentation of scientific or economic facts put before them is well thought out and appealing, their attitudes and actions would respond fully. It is for this reason that the message arising out of growing water scarcity, increasing pollution and the need for a conservation ethic has been built around a story that would appeal to the enquiring mind of a small child, who is not relying on rote memory, but who would like to absorb lessons that appeal to his or her imagination and which appear to be an intimate part of the day to day lives of children. The issues covered in this publication attempt to put across scientific and social facts in story form to stimulate the minds of young readers.

This publication would not have been possible without the partnership that has been developed between Frank Brothers & Co., an established and reputed producer of schoolbooks, and TERI, an independent non-profit research institution. The credit for this initiation and partnership goes to Mr R C Govil, Chairman, Frank Brothers & Co. (Publishers) Ltd., for having approached TERI in the first place. As it happens, within TERI itself, considerable debate and discussion had already taken place on the need for the Institute to get into the field of environmental education for children. This partnership is, therefore, timely and relevant. In any such initiative, while every effort is made to attain standards that would make the enterprise effective and worthwhile, in the ultimate analysis, it is only the user of the material produced who can testify to its value. We, at TERI, therefore, are approaching this task in a spirit of humility and would request the youngest of our young readers to give us very critical comments on this series of publications. It is only on the basis of your feedback and views that we can improve subsequent publications to reach up to your expectations. I hope you enjoy reading about Chhutki and her adventures.

R K Pachauri

Director

TERI

For the reader

This is the second of the TERI environment play series for children between the ages of 6 and 9 years, who have basic understanding and communicating skills in English.

Intended to supplement environmental studies, this book is designed as an innovative package of fun and learning through drama, simple activity, and information. The script may be used by teachers and students in the classrooms or community centres to present information and create awareness about the problems of water pollution in a new and effective form.

Simple word meanings are included alongside the text to help children clearly understand words and terms being used.

The activities suggested are simple, safe and workable, and are intended to help the students understand the practical and scientific reasons behind the environmental problems.

The scripted story deals with characters and situations that are both true-to-life and fantastic, and provides the actors with the challenge of presenting an effective dramatization which is safe, economical, and interesting.

Simple sets may be used like the teacher's table and chair for the home in scene 1 and potted plants for the hillside, and signboards on chairs to indicate factories.

Costumes can be organized from an assortment of spare, brightly coloured pieces of cloth and coloured paper.

We welcome your comments and suggestions to help us improve our future publications and make them better-suited to your needs.

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SAVING THE RIVER Water Pollution

Characters

Chhutki : An eight-year-old girl, who wants to know

everything about the world we live in.

Mother : Chhutki's mother.

Baadshah: A doll. In Chhutki's dream world, a magical old

man, cheerful, full of energy and very wise. A

good friend of Chhutki.

Woody: A talking tree. A friend of Baadshah.

Fishy : A talking fish who lives in the river.

Turtle : A talking turtle.

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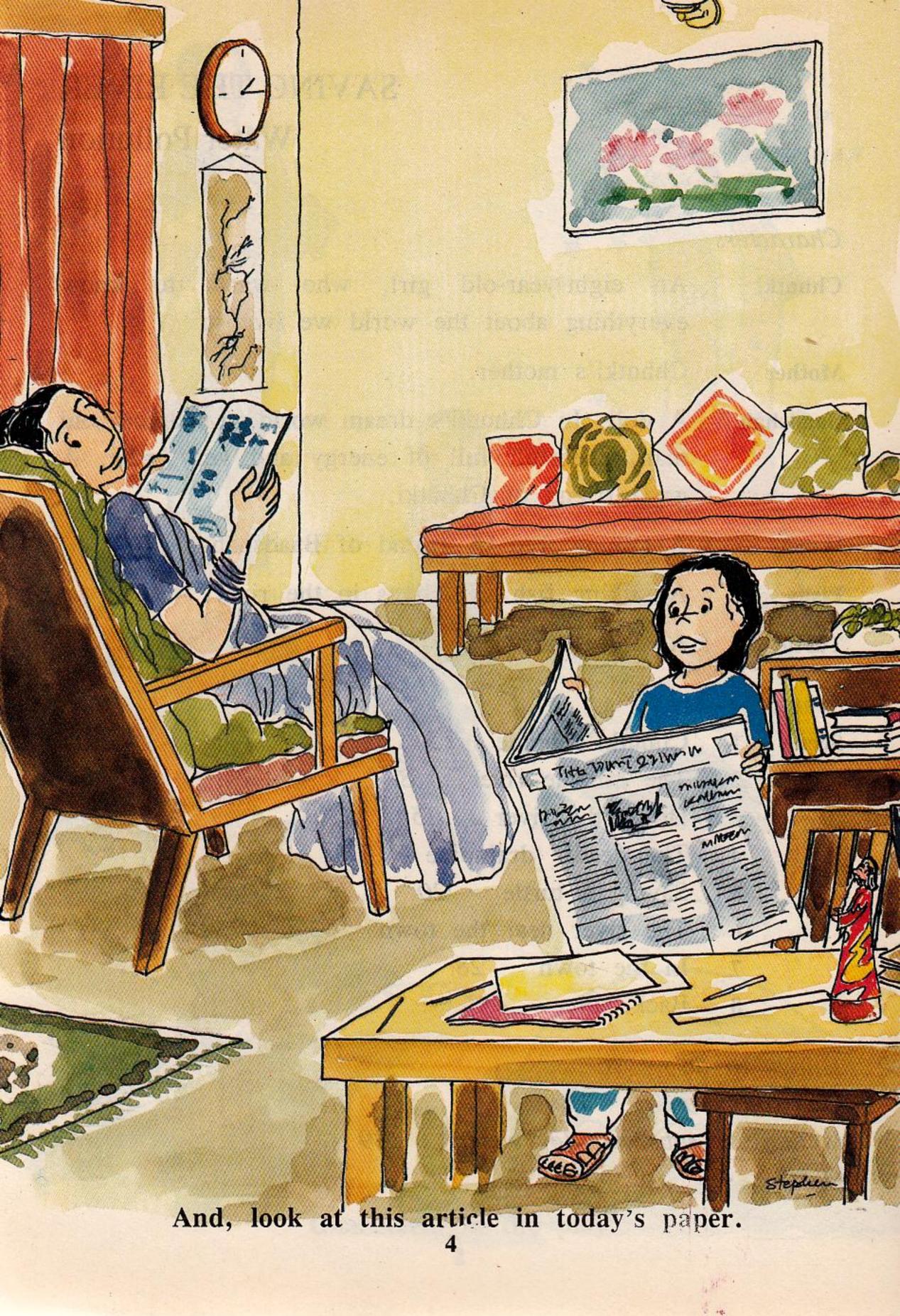
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Chhutki's home

Chhutki has returned from school and just finished her lunch. Her mother is relaxing in an armchair, reading a magazine.

Chhutki

: Mother! Dipu didn't come to school again today. I hear he is very ill. He was even in the hospital for a few days.

Mother

Yes, Chhutki. We must visit him tomorrow. He has jaundice, a bad liver infection, probably from drinking infected water somewhere. I hear one of our neighbours has typhoid. So, we must be careful and boil all drinking water properly because boiling kills germs.

Chhutki

Yes, mother. Last weekend, Lata's family had gone for a picnic to the riverside. They had great fun playing in the water, but now, Lata has a rash all over her body and her sister, Usha, has an eye infection. They too did not come to school today.

Jaundice: a liver disease.

Typhoid: an infectious fever.

Rash: spots or rough area that appear on skin because of some illness or infection.

Mother: Then something must be wrong with the water in the river.

Chhutki : You can be sure of that, mother. And, look at this article in today's paper (showing her mother the newspaper). It says that hundreds of poor fish and turtles were found dead on the river bank in a city nearby. They were poisoned by some chemicals in the water. That is so sad. Mother, why do these things happen?

Mother: Because, Chhutki, many of us don't seem to care any more about rivers and streams, forests and plants, animals and birds, and for other people too.

Chhutki: I feel sorry that I can't do anything about it.

Mother: Well! For a start, you are concerned about these things. That's good! And, you have your school project to do—the one on water pollution.

Chhutki : I haven't really started on it because I don't know where to start.

Mother : (Getting up and giving Chhutki a few books and magazines she had kept aside.) Here, look through these. I have kept them for you. I am sure you will find the pictures and stories very interesting.

Chhutki

: (Looking through the books.) My goodness! Can this be possible? This river is so beautiful but the other so dirty! All because of pollution? (Her mother goes off to another room to rest, leaving her to do her work. Chhutki picks up her doll Baadshah and begins talking to it.) Dear Baadshah, I wish you could see these pictures and read the stories—they are just unbelievable. If only I could do something to help...

(... she yawns, begins to fall asleep at the table where she sits.)

Pollution: when air, water or any other simple substance becomes dirty or impure due to the addition of harmful or unpleasant substances.

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The hillside river

In her dream Chhutki finds Baadshah standing before her, smiling as usual.

Chhutki: Baadshah, my friend, you are just the one I wanted to see!

Baadshah: Chhutki! Is something wrong? You seem rather upset.

Chhutki: I am, Baadshah! My friends are in trouble.

Dipu is down with jaundice, Lata has a body rash, Usha has an eye infection, and a number of fish and turtles have also died in the river. Do you know what has caused all this?... Water!

Baadshah: Water? But that's strange. I'm sure something was wrong with the water.

Chhutki : I don't know, Baadshah. My friends are in trouble and I can't do much to help, at least to prevent these things from happening again.

Baadshah: Wait a moment, Chhutki. The water by itself can't be the cause of so much trouble.

Something went wrong somewhere and we

must find out. Maybe we could take a trip to the river and see things for ourselves, after all the river provides us with all the water we need.

: That sounds good!

Baadshah: Just shut your eyes and on the dot, We'll soon be at a hillside spot.

(Chhutki shuts her eyes, then opens them again to find that they are standing beside a sparkling clean river, flowing through green hills with beautiful trees, flowers, insects, birds and small creatures, all living in harmony.)

Chhutki: This is the most beautiful place I have ever seen!

(A voice from behind startles her. It is Woody the tree, an old friend of Baadshah. She turns around in surprise.)

Woody: Hello Baadshah! Nice to see you again. I see, you have brought along a little friend.

Baadshah: Happy to meet you again, Woody. This is Chhutki, a very dear friend. Chhutki, this is Woody, a very old friend.



Woody: Nice to meet you, Chhutki.

Chhutki : Wow! I've never met a talking tree before.

Pleased to meet you, Woody.

Woody: Well, we trees do whisper. But no one cares

to listen to us most of the time.

Chhutki : Oh, it's so lovely, clean and fresh up here.

Baadshah: Especially the air and water (pointing to the

river nearby).

Woody: It is very sad that this beautiful river does

not remain the same as it flows on.

Chhutki : Meaning?

Woody: It gets dirtier, duller and polluted as it moves

on through towns and cities. Many of my town-dwelling fellow trees who lived along

the riverside have died. Others are very ill.

All because of the polluted water.

Chhutki: We are really sorry to know that. But how

does this happen? If we could take a look,

maybe we could think of a way to stop it.

Woody

: That is really kind of you, though I wonder what can be done. But you can certainly take a trip down the river with Fishy. I'll just call him.

Chhutki : Fishy?

Baadshah: Yes, Chhutki, he's another old friend—a fish—who lives with his family in this river. Here he is.

(A large fish with big, brown eyes, smiling brightly, swims towards them.)

Fishy: Hello, everyone!

Chhutki: Hello, Fishy, I'm Chhutki. You are beautiful! It's a pity that your home, the river, is in so much danger.

Fishy Glad to meet you! Woody just told me why you're here. I'll be very happy to take you and Baadshah down the river... if only... you weren't so big.

Baadshah: But of course, I can settle that. Right, Chhutki?

Chhutki : Right!

Baadshah: Just take a deep breath, shut your eyes,...
And soon we'll both be small in size.

(When Chhutki opens her eyes, she sees that they both are now much smaller than Fishy.)

Woody : That's a very good trick, Baadshah!

Chhutki : Yes, and he can make us big again.

Fishy: Superb! Now you both can ride on my back.

Hop on! (They climb on Fishy's back.) Hold
on to my fins tightly. I'll swim close to the
surface of the water so you won't get too
wet. I'll take you as far as it is safe to go.
I hope that's all right with you.

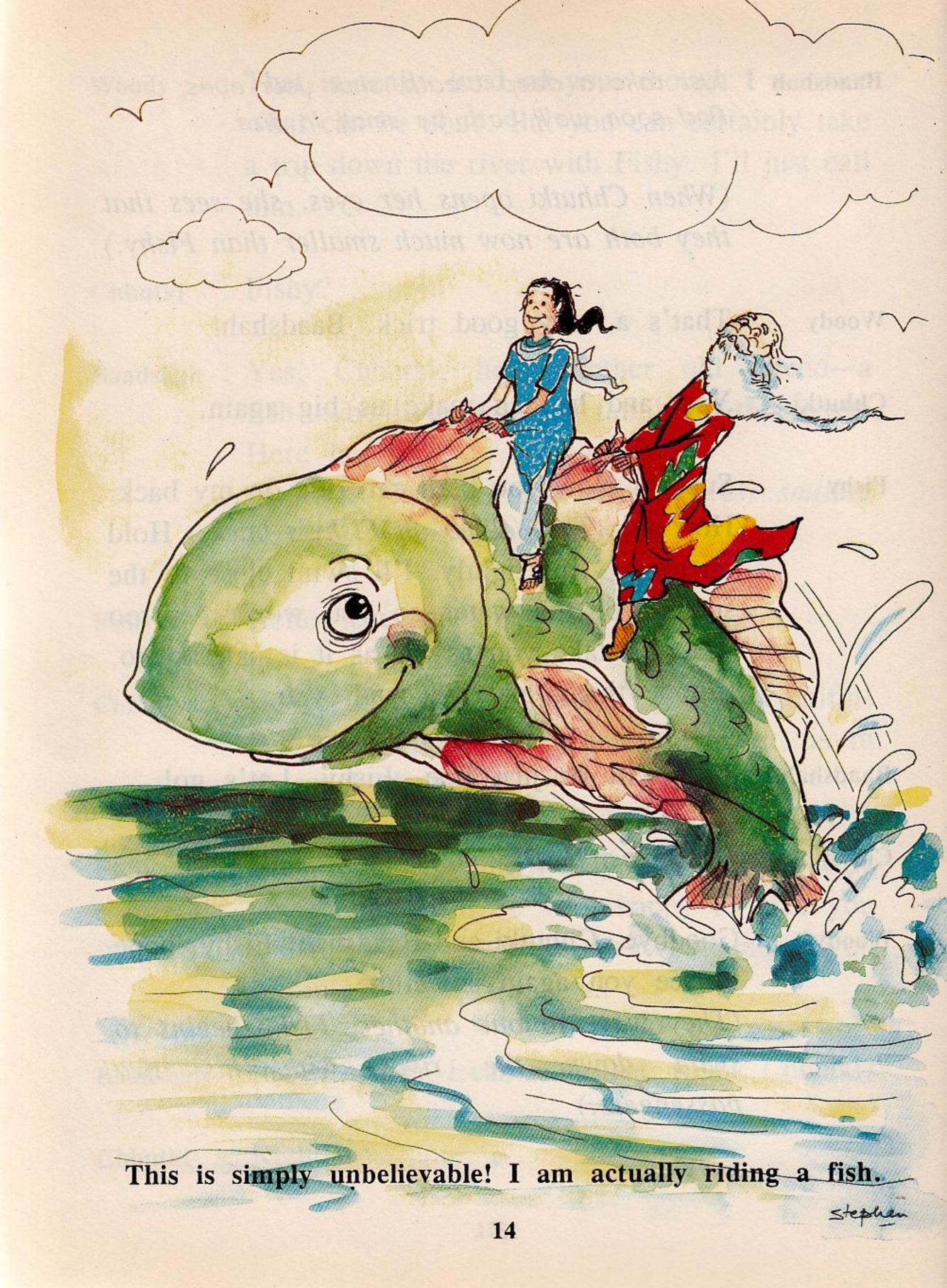
Baadshah: That will be just fine, Fishy. Let's go!

Chhutki : Goodbye, Woody!

Woody: Goodbye, Chhutki and Baadshah! Fishy, hope to see you again sometime.

(They wave to one another. Fishy begins to swim down the river with his two passengers.)

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Down the river

Chhutki: This is simply unbelievable! I am actually riding a fish!

Baadshah: The water upstream is so pure and fresh!

Fishy: True. But sadly, it won't be the same as we go further. But hold on tight. Enjoy the ride while the water is good.

(He speeds on in the water, bobbing up and down. They chatter and laugh along the way. Suddenly Chhutki hears a strange sound, like the rumbling of thunder, coming from way ahead.)

Chhutki : Can you hear that thunder-like sound coming from a distance?

Baadshah: And look, the water is no longer clean.

Chhutki : It's beginning to look a bit green and brown.

Fishy: Yes friends, that is because the water downstream becomes polluted. Fishes take oxygen from water. But as the water gets

polluted, oxygen levels in water come down drastically. Fishes do not have a choice and have to take in the same polluted water and their gills get blocked with pollutants. They die because of this. This water is not safe for me.

Baadshah: Stop right here, Fishy. You must not risk your life. We will go ahead on our own. Chhutki, grab that huge leaf floating nearby. I'll get a stick. We shall use them as a boat and an oar. They will get us to the place we need to see.

(Chhutki grabs a huge leaf floating nearby.

Baadshah finds a floating stick. Carefully he gets off Fishy's back and on to the leaf. He then helps Chhutki on to the boat.)

Chhutki: Well done, Fishy! Thank you for the most enjoyable ride I've ever had. Now you must go back to where it is safe. Goodbye!

Fishy: My pleasure! The place you need to see, lies just up ahead, where the river turns sharply to the left. Goodbye and good luck to you both! (He turns and swims off; they wave goodbye.)

The deadly drainpipe

They float on in their leaf boat with Baadshah guiding it through the water using his stick.

Chhutki: Goodness, Baadshah! That sound is getting so loud and frightening.

Baadshah: Yes, the water too has become murky and awfully smelly. Don't touch it.

(The sound has now become almost deafening. Baadshah steers the leaf boat carefully near the left bank. They move very slowly towards the turning. They stop and slowly look around the bend. What they see is absolutely shocking! A little ahead, a huge drainpipe pours out gallons of dirty, foul smelling water, which falls into the river with a thundering sound.)

Chhutki: Oh my goodness, Baadshah! This is the most frightening thing I have ever seen!

Baadshah: Yes, Chhutki, think, just one pipe pouring in so much dirt and poison into the river! Now

unpleasantly dark.



This is the most frightening thing I have ever seen!

there must be many more such pipes which empty out their waste water into this river.

Chhutki

: The poor fish, animals and plants ... water is their home ... they will all be sick and soon die. But Baadshah, where is all this filth coming from?

Baadshah : Just shut your eyes and count till three, You'll soon be big and then can see.

Saving a turtle

Chhutki shuts her eyes. When she opens them, they are both big once again. She is now able to see all around. The deadly drainpipe looks smaller, but the polluted water flowing out of it is lethal.

Baadshah: (Pointing at some factories in the distance) Look, Chhutki! Look at those buildings. They pour all their waste...poisonous waste into the river. All industries need water for various processes. This water when once used cannot be used again unless it is treated. Different kinds of industries produce different kinds of waste. The water can be recycled back but usually till date not many industries recycled the water. They release toxins into the river water. Some of the industries are leather, plastic, textile, pulp and paper, petroleum, and chemical factories ... all this dirty water is coming from there!

Lethal: deadly.

Toxins: poisonous substances.

Chhutki: Yes, I can see the factory signboards quite clearly. I must write down their names. (She takes out a small pencil and notebook from her pocket and writes the names of a few factories.) This is really terrible.

Baadshah: You see, Chhutki, the river has now reached the towns. Let us go up to that little hill. (He points to a small hill to the right.) We can see a large part of the river from there.

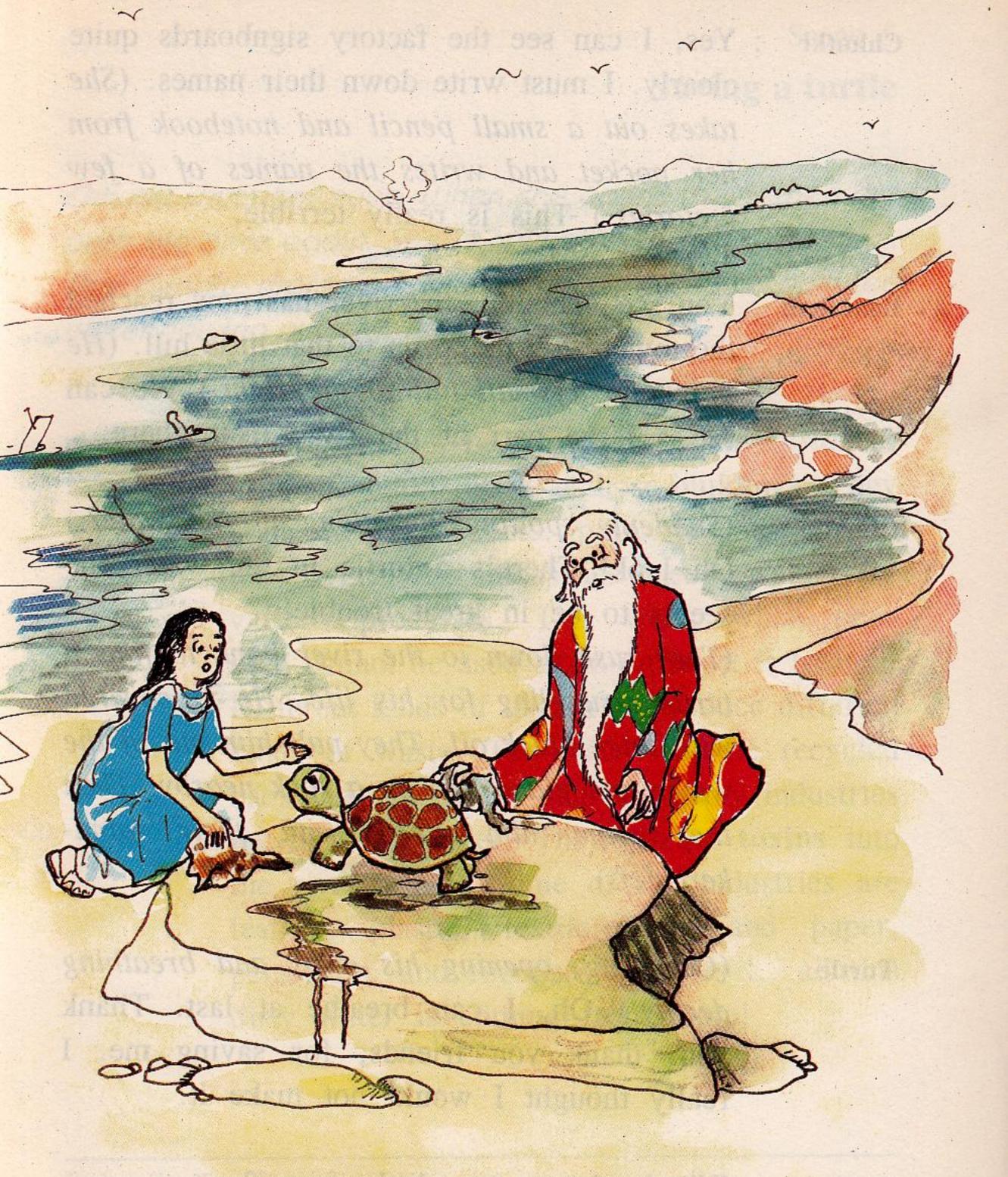
Chhutki : (Suddenly spotting something in the water.)

Oh look! There's a turtle in the water, he seems to be in great trouble!

(They rush down to the river bank to find a turtle struggling for his life. He is covered with thick black oil. They pull him out of the water and place him on a rock nearby. Then they wipe him clean with their hand-kerchiefs).

Turtle: (Coughing, opening his eyes, and breathing deeply.) Oh, I can breathe at last. Thank you, thank you friends, for saving me. I really thought I would not make it.

Chhutki: What's the matter, little friend?



What's the matter, little friend?

Turtle

: Well, while swimming about in search of food, I suddenly got covered in this huge patch of dirty, oily waste that is thrown into our home from those factories. It is so terrible, it chokes us, burns the eyes and throat, and smells awful. Thank you again for saving me. I shall walk back along the bank till I find cleaner water and will then go home. (He smiles at them and then begins to walk back slowly along the river towards his home.)

Baadshah: Oil in the water forms a coat on the gills of fish and turtles, thereby blocking any transfer of oxygen. Also, oil forms a layer on water and prevents sunlight and oxygen from air to enter into the water body like river, lake, ocean, etc. It is very difficult to remove this oil from water.

Chhutki

: Goodbye, little friend. Take care! (They watch him go.) I'm so glad we saw him and were able to help him in time. But think of so many other turtles, fish, birds, and other animals and plants who are not so lucky.

Baadshah: Yes, Chhutki. Even my magic cannot do enough to help them all. There is just too much pollution everywhere! And, most of it, sadly, is caused by people...careless people. But, there is still something we have, that can definitely help...

Chhutki : What?

Baadshah: You, and other caring people like you!

Chhutki : But how?

Baadshah: I am sure you will get some ideas as you learn more. Let's move on quickly.

The river near the town

They walk to the top of a small hill nearby from where they can see the entire stretch of river.

Chhutki: This is a good view. But, so many buildings?

Baadshah: That is because there are so many people living and working in towns and cities. Those houses along the right bank is where thousands of people live and work. They cook, clean, bathe, wash, and all their dirty drainage and sewage water is brought through pipes and poured into the river.

Chhutki: This is worse than I had imagined! Can't we talk to the people and tell them that they must not spoil the river?

Baadshah: I'm afraid, most people are not as concerned as you are. They take water and the rivers for granted...as if these will always be there. They don't care for the animals and plants that live in the water. They are too busy all day to realize that water, on which all living



things depend, is getting more and more more polluted.

Chhutki : (Pointing to the right.)

And look Baadshah, there are people down there in the river, collecting drinking water, bathing, washing their clothes, and cleaning their cattle! Don't they realize the water is so filthy?

Baadshah: Well Chhutki, some people don't know, or even if they do, many don't care. But let's take a closer look at the town.

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Just shut your eyes, hands up, hands down, And soon enough, we'll be in town.

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In the town

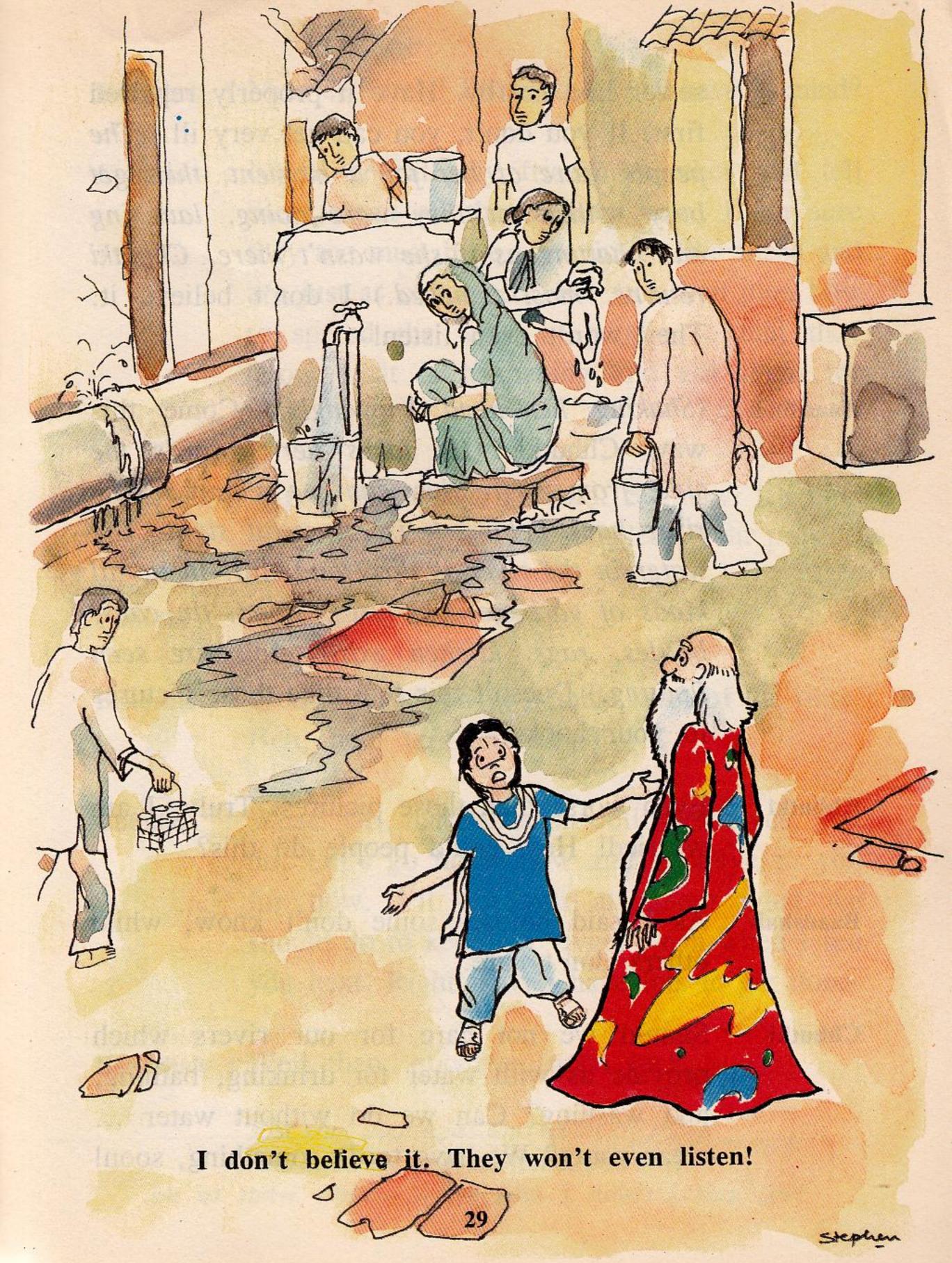
When Chhutki opens her eyes she finds they are standing in a narrow, dirty street of a very crowded, noisy town. There are houses, shops, people, animals and vehicles everywhere. To the left, is a water pipe where a group of people clamour as they collect water, bathe, wash clothes and utensils from a tap which is flowing non-stop. Just nearby is a large sewer pipe which is leaking.

Baadshah: Look, Chhutki, you mentioned that one of your friends is suffering from jaundice. This is one way how you get that dangerous infection. (Pointing at the water pipe and sewer pipe.) Now, see. There is a horrible leaking sewer pipe near the water pipe. Infection from the leaking sewage can easily spread to the water line however small the leakage may be. This can also lead to intestinal infections and gastric problems.

Chhutki : Goodness! I must tell them. (She rushes towards the people and tries to talk to them.)

Oh please, stop! Don't use this water, it could be infected. See, there is that leaking

Clamour: loud shouting or noise. Sewage: waste matter from sewers.



sewer line nearby. Have it properly repaired first. If you don't, you can get very ill. (The people stare at her for a moment, then get busy with what they were doing, laughing and chatting as if she wasn't there. Chhutki returns, most annoyed.) I don't believe it. They won't even listen!

Baadshah: (Shaking his head knowingly.) Come this way, Chhutki. (He takes her towards the side, from where they can see a part of the river bank below. It is an awful sight. The water in the river is dirty and still. In it, all kinds of garbage—old tyres, wood, tin cans, bottles, rags, kitchen waste etc., are seen floating.) Doesn't this look like those pictures in your books?

Chhutki : Even worse than those pictures. Truly, I am worried! How could people do this?

Baadshah: As I said before, some don't know, while others don't care.

Chhutki: Should we not care for our rivers which provide us with water for drinking, bathing, and washing? Can we do without water ... clean water? We have to do something, soon!

Baadshah: Most definitely! But what do you have in mind?

Chhutki : I will get all my friends together and tell them about all that I have seen. I am sure they too must have seen things like these and are just as concerned. We will then plan how to spread the word to people so that they know what is happening and ask them for their help.

Baadshah: A good beginning, Chhutki. But now, it's time you got back home and completed your project.

Chhutki: You know about that?

Baadshah: Well, I do sit on your table most of the time.

Heh, heh! (He chuckles.)

Chhutki: What? Oh, the Baadshah doll! Well, yes, you do. Let's go home now and goodbye to you for now. I'll tell you all about what we should do to keep our rivers clean when I see you next. Right now, I have lots to get done.

Baadshah: Well then, goodbye, good luck...

Just shut your eyes and count till three And soon all safe, at home, you'll be.



Yes, and I think I now know exactly what to do.

Back home

Chhutki awakes, almost falls off her chair. She is still holding in her hand the Baadshah doll.

Chbutki: Was it all a dream? But it seemed so real!

Mother : (Entering) Chhutki, have you found anything useful in those books? Did you fall asleep again?

Chhutki: Actually, both, mother. Yes, I think I now know exactly what to do.

Mother : Meaning...?

Chhutki: My project on water pollution. Tomorrow I have a very important meeting with my friends. Can I hold it here, Mother?

Mother: Meeting? Certainly, Chhutki, but about what?

Chhutki: Mother, I have decided that we must work out a plan to let people in our school and neighbourhood know about how water and

aquatic life are being destroyed by pollution and why?

Mother : And what is your plan?

Chhutki : We can start by making a list of factories that are polluting the river. We could write letters requesting them to stop this. If they don't listen, we could write to the newspapers asking them to write about it so that everyone becomes wary. We could make posters illustrating water pollution and its prevention. We can put these up in our colonies and schools. We can even make greeting cards asking people to help stop water pollution.

Mother: Chhutki, that is truly a wonderful plan. What made you think of all these things?

Chhutki : A dream, mother. Will you help us?

Mother: I'll be more than happy to help you. I'll also get some of my friends over for your meeting. Wouldn't that be good?

Aquatic life: animals and plants living in and near water.

Wary: to be on guard.

Chhutki : Wonderful, mother!

Both: For a cause as important as this, all must do

their bit. Only then things can and will get

better.

- 1. On a holiday, you can go on a long walk with a group of friends around your colony. Observe if and where there are any leaking taps and pipes. If you do find these, inform people who you feel will try to get something done to stop the leaks.
- 2. Make a list of all the reasons you can think of, why water is important for all living things. For example, we need clean water for drinking, bathing, washing clothes, etc. Plants and animals also need water. Then make posters on each of these items. The message on your poster should be short and to the point, telling people what is wrong and what they can do to set it right. You must also have a picture on your poster to make it more interesting.
- Write simple poems and songs about the river and what we must do to help keep its water clean.
- 4. Put up a play on man and water along with a group of friends. You can invite all your neighbours and friends to attend and for help in staging the play.

* Earliest recorded history of waste water treatment was written way back in 2000 BC. There are accounts in Sanskrit of how foul water is purified by boiling in copper vessels, exposing to sunlight, filtering through charcoal and cooling in earther vessels.

- * Most of our drinking water in towns and cities comes from rivers and lakes. This water gets polluted when chemical waste from factories, sewage from homes, and other waste materials are thrown into it. Effluents from agriculture also cause pollution.
- * If people want, this polluted water can be cleaned by special methods.
- * Waste items like wood, iron, tin, paper, cloth etc., can be properly reused or recycled rather than thrown into rivers.
- In India, although rivers are regarded as holy, most of them are extremely polluted.
- * The Ganga Action Plan or GAP was launched on 14 June 1986. As per this, the government plans to clean the river by treatment of household sewage and to prevent toxic and industrial chemical wastes from entering the river. GAP was also to act as a trend setter for taking up similar action plans in highly polluted stretches in other rivers of our

country. The other projects are the Yamuna Action Plan, National River Conservation Programme, and National Lake Conservation Plan.

- * Washing and bathing in polluted water causes several water borne diseases which is the main cause for illness. Some of the communicable diseases, like skin and eye infections have shown an upward trend since 1985. Minamata disease named after a fishing village in Japan, where an epidemic was first observed was found to be the result of mercury poisoning. The symptoms included spastic movements, mental retardation, coma, death, and crippling birth defects.
 - Untreated sewage is the major source of pollution in our country.
 - * Industries release into the rivers toxic chemicals which are highly injurious to health and cause diseases.
 - Waste reuse is the first important step towards stopping pollution.
 - * During the Gulf war several tonnes of crude oil was released into the sea which killed several sea creatures. Grease and oil form insoluble layers on water which are difficult to break and cause pollution of the sea.
 - * Chemical treatment of industrial waste water can either remove or reduce its concentration to such a level that it is acceptable to the river.

Is there a substitute for water?

1. Try answering the following five questions.

Instead of water,

(i) Can I use _____ for brushing teeth?

(ii) Can I use _____ for bathing?

(iii) Can I use _____ for washing clothes?

(iv) Can I use _____ for watering my plants?

(v) Can I use _____ for cooking food?

Well, it means that we only have water to take care of our daily needs. So we must save water and keep it clean.

2. Write down 10 activities for which you use water. Think of a day when you did not use water.

Now you must have realized that all our activities including small household activities require water. Since there is no substitute for water, we should make every possible effort within our reach to conserve it. Try to use water by not wasting even a drop of it.

- 1. What happens to the river when domestic sewage is put in it?
- 2. Mention a way to take out water from under the ground.
- 3. What is the temperature of water when it boils?
- 4. At what temperature is ice formed?
 - 5. Do you know how fish breathe in water?
 - 6. Mention the names of some of the creatures that live in water.
- 7. Why does rainwater fall down?
 - 8. What is water made of?
 - 9. Which water body has the maximum water on earth?
- 10. Mention some of the water games.

Answers
1. Pollution 2. Handpumps, dugwells, and tubewells 3. 100°C 4. 0°C 5. Fish have gills. They 'take in' water and after utilizing the oxygen, release the water. 6. Fish, turtle, octopus, crocodile, whale, goldfish, shark, oyster, snail. 7. Due to gravity. Doesn't everything you drop falls down? 8. Water is made of two components—hydrogen and oxygen 9. Oceans. They contain 97% of the earth's water. In Swimming, diving, boating, sailing, rowing, rafting, water skiing, etc.



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